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UNITED STATES NAVAL OBSERVATORY

C I R C U L A R N O . 1 1 8

U. S. Naval Observatory, Washington, D. C. 20390

January 5, 1968

OBSERVATIONS OF THE SUN, MOON, AND PLANETS SIX-INCH TRANSIT CIRCLE RESULTS

by

A. N. Adams and D. K. Scott

This *Circular* contains positions of the sun, moon, and planets observed with the Six-Inch Transit Circle between 29 May, 1966 and 10 July, 1967. These results are provisional. Definitive results will be published later in a volume of *Publications of the U. S. Naval Observatory*.

These results are a continuation of those published in *U. S. Naval Observatory Circular* No. 115.

The observed positions are geocentric and have received the usual corrections for instrumental errors, refraction, diurnal aberration, parallax, and orbital motion. The right ascensions were reduced, differentially, to the FK4 system by means of the FK4 stars used to determine the clock correction.

The declinations of the night objects have been reduced to the FK4 system by applying a correction derived from the same stars that were used for the clock correction.

The sun, Mercury, and Venus were reduced with the clock correction of the nearest night four and the nadirs taken at the time of the observation. Corrections for day minus night differences are not available at this time.

Observations of Mercury and Venus were made on the illuminated limb or on the center of light as indicated, and reduced with the appropriate corrections to the center of the planet. Observations of the sun, Mars, Jupiter, and Saturn were made on both pairs of limbs; those of Mars and Jupiter have been corrected for defective illumination. The tabular semidiameters from the ephemeris have been used whenever a correction from limb to center or a correction for defective illumination has been applied. The moon observations were made on the illuminated limbs as

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS

indicated and have been reduced with the tabular values of the semidiameter corrected for irradiation (*Pub. U.S. Naval Observatory*, XVI, 378) and with limb corrections from the charts of C. B. Watts (*Astro. Papers*, Vol. 17).

The computed positions with which the observed positions are compared were derived from the tabular values of the *American Ephemeris* for the instant when the ephemeris hour angle is zero on the meridian $5^{\text{h}} 8^{\text{m}} 15^{\text{s}}.849$ west longitude. No correction has been made for the difference between Ephemeris and Universal Time. The Julian Ephemeris Dates refer to the computed times of transit. The distances, in astronomical units, are those interpolated from the *American Ephemeris* at the computed time of transit. Brown's lunation numbers have been indicated for the moon.

The observers are identified as follows:

A, A.N. Adams; C, H.E. Crull; D, H.E. Durgin; G, F.S. Gauss; H, P.D. Hemenway;
I, J.R. Sievers; J, E.S. Jackson; K, B.L. Klock; L, R.E. Laubscher; R, R.W. Rhynsbarger;
S, C.A. Smith, Jr.; T, W.A. Toland; W, H.S. Liszt; X, M.A. Seeds; Y, T.E. Corbin;
Z, F.J. Giovane.

The values of ΔT from the moon observations (lunation means) are listed in Table 1. The mean value of ΔT for 1966 is $35^{\text{s}}.37 (\pm 0^{\text{s}}.15)$.

ΔT is computed by dividing (O-C) by 1.002738 times the variation per hour of longitude. The weights in right ascension are proportional to the square of $15 \cos \delta$ times the variation in right ascension per hour of longitude; those in declination are proportional to the square of the variation in declination per hour of longitude.

In order to convert from the equinox of FK4 to that of Newcomb, it is necessary to add $+1^{\text{s}}.34$ to the values of ΔT tabulated in this circular.

TABLE 1

Lun.	ΔT	P.E.	Lun.	ΔT	P.E.
	s	s		s	s
537	36.57	0.23	544	35.80	0.21
538	36.46	0.25	545	35.67	0.37
539	35.57	0.36	546	36.37	0.51
540	35.62	0.29	547	36.73	0.23
541	34.00	0.78	548	37.01	0.22
542	34.59	0.11	549	37.35	0.22
543	34.91	0.25	550	36.72	0.37

SUN

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	243		h m s	s		"	"	
66 06 06.71	9283.21304	K	4 57 09.388	+0.49	+22 39	32.32	+0.31	1.014807
66 06 09.71	9286.21343	I	5 09 32.879	+0.23	+22 56	18.07	+0.51	1.015192
66 06 12.71	9289.21385	Z	5 21 58.800	+0.60	+23 09	25.37	-0.41	1.015540
66 06 15.71	9292.21429	Z	5 34 26.506	+0.65	+23 18	53.51	-0.27	1.015845
66 06 20.71	9297.21504	Z	5 55 14.888	+0.40	+23 26	26.26	-0.04	1.016240
66 06 21.71	9298.21520	G	5 59 24.642	+0.35	+23 26	43.19	+0.82	1.016301
66 06 22.71	9299.21535	D	6 03 34.365	+0.42	+23 26	33.45	-0.10	1.016355
66 06 30.71	9307.21651	H	6 36		+23 10	31.66	-0.22	1.016619
66 07 01.71	9308.21665	T	6 40 55.753	+0.40	+23 06	40.67	-0.65	1.016633
66 07 11.71	9318.21780	T	7 22 01.077	+0.37	+22 06	24.35	-0.25	1.016581
66 07 16.71	9323.21820	I	7 42 18.733	+0.11	+21 21	51.15	+0.11	1.016382
66 07 22.71	9329.21849	D	8 06 23.042	+0.93	+20 16			1.015946
66 07 25.71	9332.21854	I	8 18 17.204	+0.22	+19 39			1.015653
66 07 26.71	9333.21854	G	8 22 14.106	+0.60	+19 25			1.015546
66 07 31.71	9338.21845	Z	8 41 49.220	+0.102	+18 15			1.014961
66 08 01.71	9339.21842	H	8 45 42.359	+0.68	+18 00			1.014834
66 08 03.71	9341.21832	H	8 53 27.007	+0.200	+17 29			1.014572
66 08 16.71	9354.21702	H	9 42 50.048	+0.40	+13 43	49.32	-0.73	1.012510
66 08 17.71	9355.21688	D	9 46 34.130	+0.005	+13 24	44.15	-1.54	1.012319
66 08 18.71	9356.21673	R	9 50 17.795	+0.77	+13 05	27.80	-0.64	1.012123
66 08 24.71	9362.21571	H	10 12 28.886	+0.24	+11 05	35.28	-0.91	1.010854
66 08 26.71	9364.21533	D	10 19 49.020	+0.101	+10 24			1.010406
66 08 27.71	9365.21513	R	10 23 28.373	+0.44	+10 03	13.78	-1.21	1.010178
66 08 28.71	9366.21493	R	10 27 07.474	+0.131	+ 9 42	08.18	-0.39	1.009949
66 08 30.71	9368.21451	G	10 34 24.301	+0.21	+ 8 59	28.31	-0.24	1.009484
66 08 31.71	9369.21430	Z	10 38 02.266	+0.22	+ 8 37	55.81	+0.28	1.009249
66 09 01.71	9370.21408	H	10 41 39.977	+0.93	+ 8 16	13.61	-0.61	1.009013
66 09 06.71	9375.21294	T	10 59 44.145	+0.08	+ 6 25			1.007809
66 09 07.71	9376.21271	T	11 03 20.401	+0.65	+ 6 03	28.81	-0.66	1.007562
66 09 09.71	9378.21223	T	11 10 32.322	+0.90	+ 5 18	20.77	-1.22	1.007063
66 09 16.71	9385.21053	D	11 35 40.446	+0.70	+ 2 37	49.89	-0.91	1.005223
66 09 17.71	9386.21028	Z	11 39 15.706	+0.113	+ 2 14	39.47	-0.49	1.004948
66 09 30.70	9399.20715	G	12 25 59.988	+0.113	- 2 48	39.99	-2.08	1.001247
66 10 03.70	9402.20649	Z	12 36 51.806	+0.106	- 3 58	22.24	+0.41	1.000397
66 10 04.70	9403.20627	D	12 40 29.652	+0.26	- 4 21	33.39	-0.71	1.000115
66 10 05.70	9404.20606	D	12 44 08.031	+0.103	- 4 44	40.35	-0.69	0.999833
66 10 06.70	9405.20585	K	12 47		- 5 07	44.73	-1.42	0.999553
66 10 07.70	9406.20565	Z	12 51 25.716	+0.11	- 5 30	43.34	-0.12	0.999273
66 10 11.70	9410.20490	G	13 06 06.568	+0.42	- 7 01	59.48	-1.04	0.998149
66 10 13.70	9412.20455	Z	13 13 29.929	+0.091	- 7 47	04.58	-0.71	0.997584
66 10 21.70	9420.20344	T	13 43 25.461	+0.103	-10 42	35.14	+1.19	0.995302
66 10 26.70	9425.20297	Z	14 02 28.053	+0.64	-12 27	18.48	-0.06	0.993910
66 10 27.70	9426.20290	C	14 06 18.543	-0.74	-12 47	41.90	-0.24	0.993639
66 10 28.70	9427.20284	T	14 10 10.039	+0.52	-13 07	53.09	-0.25	0.993371
66 10 31.70	9430.20272	G	14 21 48.798	+0.77	-14 07	10.77	+0.35	0.992587
66 11 01.70	9431.20269	T	14 25 43.215	-0.003	-14 26	30.94	-0.08	0.992332
66 11 03.70	9433.20267	Z	14 33 34.827	+0.174	-15 04			0.991832
66 11 16.70	9446.20350	T	15 26 01.789	-0.21	-18 44	55.21	+2.05	0.988808
66 11 22.70	9452.20444	T	15 51 02.122	+0.48	-20 08	36.32	+0.92	0.987543
66 11 23.70	9453.20463	R	15 55 14.975	+0.83	-20 21	17.45	+0.66	0.987345
66 11 29.70	9459.20593	C	16 20 47.664	+0.73	-21 29	17.20	+0.86	0.986264
66 11 30.70	9460.20618	T	16 25 05.703	+0.146	-21 39			0.986102
66 12 09.70	9469.20873	T	17 04 15.383	+0.98	-22 49	35.01	+1.67	0.984868
66 12 12.70	9472.20969	D	17 17 27.982	+0.181	-23 05	06.64	+0.24	0.984525
66 12 16.71	9476.21101	T	17 35 09.382	+0.144	-23 19	20.34	+1.03	0.984116

SUN

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	243		h m s	s.		° ' "	"	
66 12 19.71	9479.21204	D	17 48 27.714	+1.22	-23 25 08.20	+0.06		0.983852
66 12 25.71	9485.21411	R	18 15 06.404	+1.81	-23 23 58.62	+0.82		0.983462
66 12 27.71	9487.21479	Z	18 23 58.806	+0.92	-23 19 51.11	-0.49		0.983380
66 12 29.71	9489.21547	G	18 32 50.728	+1.18	-23 13 49.53	+0.08		0.983324
66 12 30.71	9490.21581	T	18 37 16.308	+0.53	-23 10 07.71	-0.53		0.983306
67 01 05.71	9496.21775	D	19 03 44.187	+0.82	-22 38 12.03	+1.06		0.983318
67 01 06.71	9497.21806	T	19 08		-22 31 16.16	+2.56		0.983338
67 01 09.71	9500.21896	R	19 21 14.895	+0.77	-22 07 54.46	+1.70		0.983420
67 01 11.71	9502.21953	D	19 29 57.120	+0.44	-21 50 09.45	+1.15		0.983494
67 01 18.72	9509.22128	D	20 00 05.082	+1.20	-20 34 50.47	+1.92		0.983880
67 01 23.72	9514.22228	T	20 21 14.666	+0.81	-19 29			0.984299
67 01 24.72	9515.22246	G	20 25 26.274	+1.05	-19 15 05.38	+0.63		0.984400
67 01 25.72	9516.22262	R	20 29 37.101	+1.49	-19 00 30.03	+1.95		0.984506
67 01 26.72	9517.22277	Z	20 33 47.027	+0.94	-18 45 36.26	+1.05		0.984619
67 01 30.72	9521.22330	Z	20 50 18.837	+0.36	-17 42 36.89	+0.74		0.985133
67 02 01.72	9523.22351	D	20 58 30.006	+0.73	-17 09			0.985423
67 02 02.72	9524.22360	R	21 02 34.457	+1.54	-16 51 59.86	+2.39		0.985574
67 02 03.72	9525.22368	T	21 06 37.934	+0.60	-16 34 33.69	+0.63		0.985730
67 02 08.72	9530.22395	D	21 26 43.873	+1.15	-15 03 00.89	+1.23		0.986561
67 02 10.72	9532.22399	Z	21 34 40.638	+1.15	-14 24 34.34	+1.07		0.986913
67 02 16.72	9538.22390	G	21 58 12.293	+1.13	-12 23 42.50	+0.85		0.988040
67 02 23.72	9545.22342	D	22 25 06.199	+0.47	- 9 53 48.71	+2.60		0.989512
67 03 01.72	9551.22272	K	22 47 45.211	+0.30	- 7 39 28.65	+0.57		0.990943
67 03 02.72	9552.22258	Z	22 51 29.957	+1.08	- 7 16 37.52	+2.20		0.991195
67 03 03.72	9553.22244	D	22 55 14.104	+0.64	- 6 53 42.40	+1.49		0.991449
67 03 08.72	9558.22165	T	23 13 48.513	+0.47	- 4 57 42.37	+1.24		0.992751
67 03 09.72	9559.22148	Z	23 17 30.329	+1.69	- 4 34 17.40	+0.75		0.993015
67 03 10.72	9560.22130	T	23 21 11.551	+0.62	- 4 10 47.51	+1.63		0.993280
67 03 30.71	9580.21726	G	0 34 12.133	+0.29	+ 3 41 22.45	+1.09		0.998810
67 03 31.71	9581.21705	C	0 37 50.533	+0.59	+ 4 04 39.12	+1.25		0.999103
67 04 04.71	9585.21622	T	0 52 25.207	+0.45	+ 5 36 57.77	+1.04		1.000278
67 04 12.71	9593.21468	T	1 21 43.905	+0.56	+ 8 36 34.54	+0.61		1.002575
67 04 14.71	9595.21433	D	1 29 06.262	+0.69	+ 9 20 08.86	+0.05		1.003131
67 04 18.71	9599.21366	T	1 43 54.851	-0.15	+10 45			1.004224
67 04 20.71	9601.21335	Z	1 51 21.414	+0.28	+11 26 58.15	+0.87		1.004762
67 05 05.71	9616.21175	T	2 48 10.474	+0.35	+16 11 43.37	+0.81		1.008707
67 05 09.71	9620.21156	D	3 03 40.339	+0.78	+17 18 12.97	-0.14		1.009667
67 05 10.71	9621.21153	T	3 07		+17 34 07.91	-0.25		1.009897
67 05 12.71	9623.21149	G	3 15 23.779	+0.97	+18 05 04.26	-0.75		1.010346
67 05 19.71	9630.21154	D	3 43 04.559	+0.36	+19 43 34.04	+0.85		1.011791
67 05 25.71	9636.21183	G	4 07 09.043	+0.52	+20 54 52.89	-0.49		1.012922
67 05 26.71	9637.21190	D	4 11 11.669	+1.26	+21 05 32.05	-0.61		1.013102
67 06 07.71	9649.21314	T	5 00 17.525	+0.84	+22 44 09.79	-0.18		1.014977
67 06 09.71	9651.21340	D	5 08 33.635	+0.73	+22 55 08.10	-0.27		1.015219
67 06 12.71	9654.21382	D	5 20 59.602	+0.79	+23 08 34.17	+0.01		1.015541
67 06 13.71	9655.21397	T	5 25 08.618	+0.65	+23 12 13.30	-0.49		1.015637
67 06 20.71	9662.21501	R	5 54 14.599	+1.02	+23 26 18.97	-1.00		1.016187
67 06 21.71	9663.21516	L	5 58		+23 26 41.36	-0.38		1.016250
67 06 22.71	9664.21531	L	6 02 33.632	+0.17	+23 26 38.66	-0.10		1.016311
67 07 05.71	9677.21712	T	6 56 26.272	+0.51	+22 48 41.98	-0.34		1.016734
67 07 06.71	9678.21724	D	7 00 33.387	+1.44	+22 42 57.71	+0.29		1.016730
67 07 07.71	9679.21736	L	7 04 40.054	+1.37	+22 36 48.03	-0.80		1.016721
67 07 10.71	9682.21768	X	7 16		+22 16 01.75	-0.76		1.016654

MERCURY

Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	243			h	m	s		°	'	"	
66 08 24.67	9362.17479	H	C	9	13	23.928	+0.088	C +16 58	49.29	-1.33	1.123279
66 08 27.68	9365.18159	R	C	9	35	02.747	+0.148	C +15 45	04.82	-1.11	1.193450
66 08 28.68	9366.18403	R	C	9	42	30.173	+0.194	C +15 15	17.24	-0.63	1.214699
66 09 06.70	9375.20606	T	C	10	49	48.245	+0.064	+ 9 21			1.349276
66 09 16.72	9385.22588	D	C	11	57	50.786	+0.135	C + 1 31	18.47	-2.46	1.394976
66 10 03.74	9402.24899	Z	C	13	38	14.269	+0.097	C -10 59	48.23	-0.35	1.322446
66 10 07.75	9406.25331	Z	C	14	00	14.824	+0.093	C -13 32	15.51	-1.79	1.285598
66 10 11.75	9410.25732	G	C	14	21	48.503	+0.076	C -15 52	21.05	-0.57	1.241731
66 10 12.75	9411.25827	T	C	14	27	07.225	-0.048	C -16 25	15.28	+0.35	1.229652
66 10 21.76	9420.26538	T	C	15	12	51.673	+0.052	C -20 37	08.33	+1.53	1.100388
66 12 30.68	9490.18367	T	C	17	50	52.023	+0.173	C -24 06	48.16	+1.42	1.393677
67 01 06.69	9497.19780	T	C	18	38	52.123	+0.232	C -24 30	14.59	+3.13	1.426206
67 01 11.70	9502.20843	D	C	19	13	55.725	+0.192	C -24 05	52.45	+0.53	1.433100
67 01 25.73	9516.23902	R	C	20	53	17.882	+0.180	C -19 38	26.45	+1.68	1.372376
67 01 30.74	9521.24956	Z	C	21	28	14.208	+0.124	C -16 50	18.79	+0.08	1.315353
67 02 10.76	9532.26798	Z	C	22	38	11.979	+0.105	C - 8 58	11.04	+1.12	1.101589
67 02 14.77	9536.27047	T	C	22	57	33.385	+0.092	C - 6 02	33.55	+2.29	0.994998
67 02 16.77	9538.27013	G	C	23	04	57.325	+0.094	C - 4 43	58.93	+1.65	0.938882
67 04 28.67	9609.17696	D	C	1	30	21.070	+0.087	C + 7 25	15.27	+0.53	1.260998
67 05 25.75	9636.25829	G	C	5	14	13.584	+0.093	C +25 02	58.15	+0.45	1.160965
67 05 26.76	9637.26119	D	C	5	22	21.445	+0.079	C +25 14	43.74	+0.67	1.142309
67 06 12.78	9654.28732	D	C	7	07	07.102	+0.057	C +23 41	25.48	-1.09	0.815633

VENUS

66 06 01.60	9278.10288	T	2	1	58	22.545	+0.115	N + 9 50	27.64	+0.63	1.112453
66 06 02.60	9279.10319	R	2	2	02	46.622	+0.146	N +10 14	00.22	+1.23	1.119607
66 06 16.60	9293.10882	G	2	3	06	05.642	+0.231	N +15 22	12.70	+0.78	1.216728
66 06 20.61	9297.11087	Z	2	3	24	49.585	+0.169	N +16 40	17.18	+0.22	1.243302
66 06 21.61	9298.11141	G	2	3	29	33.426	+0.196	N +16 58	56.15	+0.69	1.249858
66 06 22.61	9299.11197	D	2	3	34	18.390	+0.209	N +17 17	12.71	+1.36	1.256378
66 06 30.61	9307.11691	R	2	4	12	58.597	+0.088	N +19 28	27.18	-0.15	1.307248
66 07 01.61	9308.11759	T	2	4	17	53.750	+0.142	N +19 42	49.12	-1.77	1.313443
66 07 11.62	9318.12501	T	2	5	08	01.990	+0.115	C +21 38	40.06	+1.06	1.373229
66 07 16.62	9323.12910	I	2	5	33	39.979	+0.153	+22 15			1.401541
66 07 18.63	9325.13080	W	2	5	44	00.006	+0.130	N +22 26	08.28	-0.28	1.412551
66 07 26.63	9333.13780	G	2	6	25	38.468	+0.176	+22 43			1.454762
66 07 31.64	9338.14225	Z	2	6	51	47.071	+0.229	+22 32			1.479658
66 08 01.64	9339.14314	H	2	6	57	00.679	+0.159	+22 28			1.484498
66 08 03.64	9341.14491	H	2	7	07	27.663	+0.220	+22 19			1.494036
66 08 18.65	9356.15763	R	2	8	24	57.714	+0.226	S +19 44	12.08	-1.84	1.559261
66 08 24.66	9362.16221	H	2	8	55	13.888	+0.192	S +18 05	15.91	-1.63	1.582114
66 08 26.66	9364.16366	D	2	9	05	12.208	+0.195	S +17 28	04.09	-1.39	1.589323
66 08 27.66	9365.16436	R	2	9	10	09.975	+0.182	S +17 08	43.38	-1.17	1.592853
66 08 28.66	9366.16506	R	2	9	15	06.896	+0.248	S +16 48	53.03	-1.41	1.596331
66 09 01.66	9370.16774	H	2	9	34	44.897	+0.059	S +15 24	53.99	-0.13	1.609738
66 09 07.67	9376.17144	T	2	10	03	45.166	+0.106	S +13 06	03.23	-0.51	1.628316
66 09 09.67	9378.17260	T	2	10	13	18.325	+0.048	S +12 16	41.34	-1.16	1.634094
66 09 16.67	9385.17636	D	2	10	46	20.413	+0.254	S + 9 13	38.92	-2.67	1.652647
66 09 23.67	9392.17976	Z	2	11	18	50.484	+0.194	S + 5 57	47.90	-1.49	1.668629
66 09 30.68	9399.18291	G	2	11	50	59.623	+0.153	+ 2 33			1.682145
66 10 03.68	9402.18423	Z	2	12	04	43.239	+0.174	S + 1 03	52.60	-1.06	1.687199
66 10 06.68	9405.18554	K	2	12	18	26.531	+0.178	S - 0 26	00.52	-2.11	1.691813
66 10 13.68	9412.18865	Z	2	12	50	32.307	+0.078	- 3 55			1.700850
66 10 26.69	9425.19510	Z		13	51			S -10 13	34.48	-0.60	1.711310

6 SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS

VENUS

Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	243			h m s		s		° ' "		"	
66 11 23.71	9453.21534	R	1	16 10	42.777	+0.054	N -20 53	50.24	+1.48		1.708271
66 11 29.72	9459.22104	C	1	16 42	36.642	+0.039	N -22 19	25.11	-1.37		1.703331
66 12 12.73	9472.23461	D	1	17 53	27.641	+0.100	N -24 00	59.91	+1.23		1.687831
66 12 16.73	9476.23896	T	1	18 15	30.701	+0.187	N -24 07	32.32	-0.62		1.681723
66 12 19.74	9479.24222	D	1	18 32	02.799	+0.010	-24 04				1.676732
66 12 25.74	9485.24866	R	1	19 04	59.818	+0.051	S -23 38	25.54	+0.23		1.665734
66 12 27.75	9487.25076	Z	1	19 15	54.790	+0.111	S -23 23	50.86	-0.11		1.661774
66 12 29.75	9489.25283	G	1	19 26	46.880	+0.093	S -23 06	23.22	+0.03		1.657669
67 01 05.75	9496.25973	D	1	20 04	21.262	-0.059	S -21 43	24.63	+0.49		1.642158
67 01 06.76	9497.26067	T	1	20 09	39.391	+0.076	S -21 28	51.55	+2.20		1.639794
67 01 11.76	9502.26517	D	1	20 35	51.626	-0.057	S -20 06	53.87	+0.19		1.627398
67 01 16.76	9507.26930	C	1	21 01	32.506	+0.045	S -18 30	16.86	+0.75		1.614031
67 01 18.77	9509.27085	D	1	21 11	39.504	-0.033	-17 47				1.608413
67 01 24.77	9515.27512	G	1	21 41	29.089	+0.118	S -15 29	06.57	+0.69		1.590642
67 01 25.77	9516.27578	R	1	21 46	22.799	+0.141	S -15 04	25.42	+1.22		1.587548
67 01 26.77	9517.27643	Z	1	21 51	15.133	+0.056	S -14 39	20.48	+0.98		1.584418
67 01 30.77	9521.27886	Z	1	22 10	32.488	-0.022	-12 55				1.571518
67 02 03.78	9525.28109	T	1	22 29	31.819	+0.165	S -11 05	31.82	+0.22		1.558008
67 02 08.78	9530.28361	D	1	22 52	52.656	-0.003	S - 8 41	59.20	+0.50		1.540222
67 02 10.78	9532.28454	Z	1	23 02	06.818	+0.109	S - 7 42	54.20	+0.21		1.532821
67 02 14.78	9536.28630	T	1	23 20	25.577	+0.124	S - 5 42	24.14	+1.98		1.517513
67 02 16.78	9538.28714	G	1	23 29	30.854	+0.114	S - 4 41	15.30	+0.33		1.509607
67 02 23.78	9545.28987	D	1	0 01	03.137	-0.020	S - 1 03	56.83	+0.06		1.480610
67 03 01.79	9551.29207	K	1	0 27	53.452	+0.063	S + 2 03	52.47	+1.10		1.454141
67 03 03.79	9553.29280	D	1	0 36	49.469	-0.022	S + 3 06	18.71	+1.05		1.444983
67 03 09.79	9559.29501	Z	1	1 03	40.624	+0.084	S + 6 11	46.69	-0.04		1.416470
67 03 30.80	9580.30425	G	1	2 39	48.517	-0.009	+16 05				1.303973
67 03 31.80	9581.30478	C	1	2 44	31.191	-0.020	S +16 30	22.19	+0.79		1.298134
67 04 14.81	9595.31334	D	1	3 52	04.814	-0.061	S +21 31	07.83	-0.51		1.211821
67 04 20.81	9601.31760	Z	1	4 21	53.215	-0.044	S +23 08	23.79	-0.70		1.172238
67 04 28.82	9609.32366	D	1	5 02	10.347	-0.112	S +24 43	42.44	-1.39		1.117240
67 05 25.84	9636.34311	G	1	7 16	41.964	-0.023	N +24 51	22.36	-0.76		0.915586
67 06 20.84	9662.34977	R	1	9 08	49.652	-0.015	N +18 19	20.09	-0.17		0.706628
67 06 26.84	9668.34848	T	1	9 30	37.366	-0.003	N +16 13	02.55	-0.94		0.657937
67 07 07.84	9679.34268	L	1	10 05	36.796	+0.002	N +12 05	28.19	-1.17		0.569947

MARS

67 02 13.39	9534.89810	G		13 55	56.272	+0.077	- 9 15	20.97	-1.18	0.987525
67 02 22.37	9543.87831	S		14 02	51.057	+0.088	- 9 48	45.94	-0.37	0.905058
67 02 27.36	9548.86645	G		14 05	26.171	+0.060	-10 00	47.78	+0.06	0.861574
67 03 01.36	9550.86151	C		14 06	11.507	+0.089	-10 04			0.844728
67 03 02.35	9551.85900	T		14 06	30.341	+0.055	-10 05	38.26	-0.41	0.836434
67 03 08.34	9557.84328	J		14 07	27.525	+0.029	-10 09	37.55	-0.59	0.788648
67 03 10.33	9559.83778	Z		14 07	24.283	+0.022	-10 09	12.45	-0.41	0.773555
67 03 11.33	9560.83498	T		14 07	18.334	+0.030	-10 08	39.75	-0.13	0.766181
67 03 18.31	9567.81443	G		14 05	14.085	+0.048	- 9 58			0.718094
67 03 19.31	9568.81136	Y		14 04	44.429	+0.038	- 9 56	19.84	+0.04	0.711769
67 03 20.30	9569.80825	J		14 04	11.818	+0.037	- 9 53	48.00	-0.20	0.705590
67 03 25.29	9574.79221	C		14 00	44.871	-0.011	- 9 37	56.48	-0.67	0.676987
67 03 27.28	9576.78557	G		13 59	02.174	+0.020	- 9 30	07.60	+0.22	0.666669
67 03 30.27	9579.77536	K		13 56	07.750	+0.014	- 9 16	56.73	+0.81	0.652467
67 03 31.27	9580.77190	G		13 55	04.413	+0.013	- 9 12	11.65	-0.07	0.648085

MARS

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	243		h m s	s		° ' "	"	
67 04 04.25	9584.75778	J	13 50 27.129	-.003	- 8 51	25.00	-0.03	0.632403
67 04 05.25	9585.75419	K	13 49 12.340	+.015	- 8 45	50.18	-0.16	0.628957
67 04 12.22	9592.72848	G	13 39 41.466	+.003	- 8 03	33.99	+0.22	0.610406
67 04 15.21	9595.71727	D	13 35 19.798	-.075	- 7 44	27.54	+0.24	0.605509
67 04 21.19	9601.69478	Z	13 26 30.279	-.064	- 7 06			0.601237
67 04 23.18	9603.68732	R	13 23 36.867	-.014	- 6 54			0.601417
67 04 24.18	9604.68360	K	13 22 11.445	-.006	- 6 48			0.601800
67 04 29.16	9609.66523	Y	13 15 23.029	-.025	- 6 21	01.74	-0.02	0.606566
67 05 04.14	9614.64737	J	13 09 18.129	-.036	- 5 58	04.76	-0.15	0.615870
67 05 13.11	9623.61698	Z	13 00 54.577	-.012	- 5 31	58.29	-0.17	0.642812
67 05 17.10	9627.60433	J	12 58 24.986	-.014	- 5 27	35.65	-0.08	0.658390
67 05 18.10	9628.60126	G	12 57 55.112	-.033	- 5 27	13.89	-0.43	0.662582
67 05 25.08	9635.58071	S	12 55 50.450	-.022	- 5 32	39.04	+0.54	0.694806
67 05 26.07	9636.57791	J	12 55 44.534	-.007	- 5 34	33.17	+0.09	0.699779
67 05 27.07	9637.57514	Y	12 55 41.481	-.021	- 5 36	43.52	-0.47	0.704834
67 06 03.05	9644.55670	J	12 56 39.376	-.039	- 5 59	11.40	-0.15	0.742289
67 06 04.05	9645.55419	S	12 56 58.686	.000	- 6 03	24.17	+0.15	0.747901
67 06 06.04	9647.54927	D	12 57 45.118	-.046	- 6 12	34.26	-0.30	0.759294
67 06 07.04	9648.54685	S	12 58 12.313	-.010	- 6 17	29.93	+0.08	0.765068
67 06 08.04	9649.54446	G	12 58 42.050	+.022	- 6 22	40.16	-0.25	0.770892
67 06 09.04	9650.54210	J	12 59 14.285	+.014	- 6 28	04.26	-0.83	0.776762
67 06 10.03	9651.53977	G	12 59 48.994	-.008	- 6 33	40.54	-0.26	0.782675
67 06 11.03	9652.53747	J	13 00 26.161	-.019	- 6 39	30.19	+0.09	0.788627
67 06 17.02	9658.52423	C	13 04 58.452	+.017	- 7 18			0.825061

JUPITER

66 12 15.33	9474.83196	T	8 23 52.734	-.014	+19 47	12.91	+0.04	4.461410
66 12 17.32	9476.82605	T	8 23 13.901	-.030	+19 49	46.42	-0.78	4.441841
66 12 19.32	9478.82011	K	8 22 32.308	-.025	+19 52	29.84	-0.28	4.423223
67 01 13.24	9503.74373	S	8 10 48.856	-.019	+20 34	37.06	-0.13	4.281989
67 01 17.23	9507.73128	Z	8 08 36.311	-.068	+20 41	57.20	-0.88	4.276763
67 01 18.22	9508.72816	J	8 08 02.920	-.062	+20 43	48.22	+0.54	4.276247
67 01 20.22	9510.72193	K	8 06 55.989	-.059	+20 47	24.39	-1.16	4.276163
67 01 23.21	9513.71258	Y	8 05 15.597	-.084	+20 52	47.37	-0.49	4.278407
67 01 24.20	9514.70946	R	8 04 42.297	-.037	+20 54	32.99	-0.84	4.279784
67 01 26.20	9516.70324	R	8 03 35.885	-.050	+20 58	03.10	-0.06	4.283477
67 01 29.19	9519.69391	J	8 01 57.361	-.053	+21 03	10.04	+0.36	4.291350
67 01 30.19	9520.69080	Y	8 01 24.893	-.060	+21 04	49.73	+0.17	4.294593
67 02 04.17	9525.67532	S	7 58 46.566	-.064	+21 12	48.55	-0.41	4.315389
67 02 09.15	9530.65994	D	7 56 17.067	-.015	+21 20			4.343662
67 02 12.15	9533.65078	J	7 54 52.641	-.058	+21 24	14.97	-0.45	4.364087
67 02 13.14	9534.64774	Z	7 54 25.569	-.018	+21 25	32.69	-0.59	4.371454
67 02 14.14	9535.64470	K	7 53 58.983	-.034	+21 26	48.78	-0.44	4.379094
67 02 20.12	9541.62662	C	7 51 31.852	-.131	+21 33	43.24	-0.01	4.430454
67 02 22.12	9543.62065	Z	7 50 48.015	-.038	+21 35	44.76	-0.24	4.449580
67 02 25.11	9546.61176	J	7 49 47.187	-.048	+21 38			4.480036
67 02 27.10	9548.60587	K	7 49 10.124	-.070	+21 40	12.02	-0.89	4.501470

SATURN

66 08 17.30	9354.80976	H	23 58 42.529	+.053	- 2 45	43.86	+0.57	8.723515
66 08 18.30	9355.80689	D	23 58 30.353	+.008	- 2 47	14.49	+1.59	8.714195
66 08 19.30	9356.80401	R	23 58 17.937	-.010	- 2 48	47.81	+1.42	8.705120
66 08 26.28	9363.78382	T	23 56 44.410	+.024	- 3 00	17.74	+0.33	8.648741
66 08 27.28	9364.78093	D	23 56 30.127	-.004	- 3 01	59.66	+1.49	8.641738

SATURN

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
243								
			h m s	s		° ' "	"	
66 08 29.27	9366.77513	T	23 56 01.004	-.007	- 3 05	29.91	+0.48	8.628545
66 08 30.27	9367.77223	H	23 55 46.159	-.001	- 3 07	15.91	+0.55	8.622358
66 09 03.26	9371.76060	T	23 54 45.033	+.041	- 3 14			8.600402
66 09 08.24	9376.74603	H	23 53 25.162	-.016	- 3 23	43.17	+1.26	8.579378
66 09 10.24	9378.74019	T	23 52 52.442	+.026	- 3 27	28.75	+0.91	8.573016
66 09 11.23	9379.73727	G	23 52 35.917	+.030	- 3 29	21.68	+1.06	8.570280
66 09 12.23	9380.73434	T	23 52 19.301	+.033	- 3 31	15.74	+0.33	8.567844
66 09 18.21	9386.71679	Z	23 50 38.173	-.020	- 3 42	37.44	+0.05	8.559580
66 09 23.20	9391.70216	G	23 49 13.322	-.005	- 3 51	58.35	+1.30	8.561056
66 10 07.16	9405.66127	K	23 45 22.331	-.021	- 4 16	42.03	+0.86	8.605161
66 10 09.15	9407.65545	G	23 44 51.150	+.008	- 4 19	57.12	+0.55	8.616167
66 10 14.14	9412.64093	Z	23 43 36.043	-.019	- 4 27	39.59	+0.28	8.648661
66 10 21.12	9419.62071	D	23 41 59.741	-.078	- 4 37	16.32	+0.21	8.705621
66 10 22.11	9420.61783	Z	23 41 47.062	+.018	- 4 38	31.23	+0.22	8.714796
66 10 23.11	9421.61495	C	23 41 34.544	+.014	- 4 39			8.724221
66 10 27.10	9425.60349	R	23 40 47.175	-.039	- 4 44	15.57	+0.33	8.764344
66 10 28.10	9426.60063	G	23 40 36.122	+.021	- 4 45	18.48	+0.03	8.774963
66 10 29.09	9427.59777	Y	23 40 25.254	-.035	- 4 46	18.26	+0.67	8.785810
66 10 31.09	9429.59207	C	23 40 04.636	+.048	- 4 48	12.81	+0.32	8.808174
66 11 02.08	9431.58639	D	23 39 45.137	-.015	- 4 49			8.831405
66 11 04.08	9433.58072	J	23 39 26.999	-.018	- 4 51			8.855475

URANUS

67 02 04.32	9525.82761	T	11 38 40.267	-.047	+ 3 10	40.23	-0.12	17.509872
67 02 05.32	9526.82480	Z	11 38 33.534	-.059	+ 3 11	25.35	-0.28	17.499057
67 02 13.30	9534.80228	G	11 37 34.738	-.067	+ 3 17	58.38	-0.27	17.421609
67 02 22.27	9543.77684	S	11 36 19.720	-.067	+ 3 26	15.06	+0.85	17.355111
67 02 25.26	9546.76834	T	11 35 53.105	-.042	+ 3 29	09.02	+0.08	17.338068
67 02 26.26	9547.76551	Z	11 35 44.067	-.044	+ 3 30			17.332973
67 02 27.26	9548.76267	G	11 35 34.936	-.071	+ 3 31	07.92	+0.36	17.328173
67 03 01.25	9550.75700	C	11 35 16.565	-.051	+ 3 33	07.68	+0.13	17.319464
67 03 02.25	9551.75416	T	11 35 07.279	-.059	+ 3 34	07.46	-0.52	17.315553
67 03 04.24	9553.74848	D	11 34 48.590	-.048	+ 3 36	09.51	-0.09	17.308644
67 03 08.23	9557.73713	J	11 34 10.688	-.055	+ 3 40	15.19	-0.15	17.298471
67 03 25.18	9574.68883	R	11 31 28.277	-.058	+ 3 57	36.40	-0.76	17.309991
67 03 27.18	9576.68316	J	11 31 09.658	-.053	+ 3 59	35.30	-0.10	17.317090
67 03 30.17	9579.67465	S	11 30 42.148	-.059	+ 4 02	29.20	-0.31	17.329932
67 03 31.17	9580.67181	J	11 30 33.118	-.052	+ 4 03	26.25	-0.34	17.334787
67 04 01.16	9581.66898	Y	11 30 24.156	-.047	+ 4 04	23.02	-0.14	17.339934
67 04 03.16	9583.66332	S	11 30 06.444	-.046	+ 4 06	14.81	+0.08	17.351087
67 04 04.16	9584.66048	R	11 29 57.710	-.040	+ 4 07	09.78	+0.10	17.357095
67 04 05.15	9585.65765	C	11 29 49.059	-.033	+ 4 08	03.81	-0.25	17.363372
67 04 09.14	9589.64634	J	11 29 15.306	-.060	+ 4 11	35.20	+0.01	17.391270
67 04 15.12	9595.62941	C	11 28 27.953	-.026	+ 4 16			17.441085

NEPTUNE

66 06 03.15	9279.65057	R	15 13 09.026	-.195	-16 04	00.46	+1.33	29.379322
66 06 06.14	9282.64218	G	15 12		-16 02	56.49	+0.27	29.398915
66 06 07.13	9283.63938	R	15 12 45.641	-.198	-16 02	35.12	+0.54	29.405972
66 06 08.13	9284.63658	R	15 12 39.896	-.236	-16 02	13.92	+0.89	29.413288
66 06 13.12	9289.62261	Z	15 12 12.271	-.264	-16 00	33.83	+1.14	29.453741

NEPTUNE

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	243		h m s	s		° ' "	"	
66 06 23.09	9299.59474	H	15 11 22.821	-.226	-15 57 40.00	+1.14	29.552869	
67 04 04.32	9584.82548	J	15 28 12.119	-.336	-17 02 25.37	+0.76	29.551343	
67 04 12.30	9592.80318	G	15 27 32.681	-.272	-16 59 43.75	+1.59	29.469319	
67 04 23.27	9603.77243	J	15 26 30.548	-.268	-16 55		29.383186	
67 04 29.25	9609.75562	G	15 25 53.804	-.252	-16 53 16.87	+1.98	29.350092	
67 05 04.24	9614.74160	S	15 25 22.054	-.254	-16 51 16.91	+1.35	29.330319	
67 05 09.22	9619.72758	T	15 24 49.553	-.294	-16 49 14.67	+1.44	29.317821	
67 05 13.21	9623.71635	G	15 24 23.362	-.280	-16 47 37.45	+0.92	29.313126	
67 05 17.20	9627.70513	J	15 23 57.085	-.292	-16 46 00.05	+1.39	29.313165	
67 05 24.18	9634.68549	J	15 23 11.443	-.268	-16 43 13.65	+1.03	29.324473	
67 05 25.18	9635.68268	S	15 23 05.022	-.249	-16 42 50.43	+0.91	29.327240	
67 05 26.17	9636.67988	J	15 22 58.615	-.242	-16 42 26.86	+1.32	29.330303	
67 05 27.17	9637.67707	D	15 22 52.203	-.266	-16 42 03.86	+1.32	29.333645	
67 05 29.17	9639.67147	Y	15 22 39.518	-.257	-16 41 18.93	+0.74	29.341183	
67 06 04.15	9645.65465	S	15 22 02.268	-.265	-16 39 06.03	+1.33	29.370543	
67 06 05.15	9646.65185	G	15 21 56.209	-.274	-16 38 44.69	+1.34	29.376401	
67 06 06.14	9647.64905	D	15 21 50.223	-.262	-16 38 24.01	+0.93	29.382545	
67 06 07.14	9648.64625	S	15 21 44.277	-.267	-16 38 03.06	+1.05	29.388945	
67 06 08.14	9649.64346	G	15 21 38.409	-.251	-16 37 42.32	+1.22	29.395618	
67 06 10.13	9651.63786	G	15 21 26.815	-.256	-16 37 02.43	+0.84	29.409762	
67 06 11.13	9652.63507	J	15 21 21.095	-.273	-16 36 42.56	+1.03	29.417237	
67 06 17.11	9658.61830	C	15 20		-16 34 49.92	+1.74	29.467368	
67 06 21.10	9662.60715	R	15 20 27.905	-.231	-16 33 42.51	+0.90	29.505658	

CERES

66 10 03.44	9401.94262	T	6 15 51.093	-.188	+21 36 10.32	-0.82	2.414379
66 10 07.43	9405.93381	K	6 18 53.671	-.210	+21 43 39.00	-0.92	2.358634
66 10 08.43	9406.93157	Z	6 19 36.390	-.187	+21 45 34.37	-1.36	2.344765
66 10 13.42	9411.92016	T	6 22 50.862	-.227	+21 55 40.72	-1.02	2.275977
66 10 14.41	9412.91784	J	6 23 25.849	-.212	+21 57 48.16	-0.75	2.262354
66 10 18.40	9416.90837	G	6 25 31.962	-.222	+22 06 40.56	-0.60	2.208435
66 10 21.40	9419.90110	G	6 26 51.576	-.230	+22 13 46.76	-1.23	2.168699
66 10 22.39	9420.89864	T	6 27 15.136	-.262	+22 16 15.02	-0.95	2.155606
66 10 28.38	9426.88352	S	6 29 04.443	-.245	+22 32 08.34	-0.63	2.078895
66 10 30.37	9428.87833	D	6 29 28.142	-.289	+22 37 51.88	-1.00	2.054115
66 10 31.37	9429.87571	T	6 29 37.562	-.279	+22 40 49.54	-0.50	2.041889
66 11 01.37	9430.87307	G	6 29 45.335	-.263	+22 43 50.48	-0.18	2.029778
66 11 20.31	9449.81905	C	6 26 39.676	-.355	+23 52 16.31	-1.12	1.827357
66 11 22.31	9451.81293	S	6 25 42.837	-.355	+24 00 37.53	-0.88	1.809820
66 11 23.30	9452.80984	T	6 25 11.820	-.371	+24 04 51.27	-1.47	1.801371
66 11 27.29	9456.79730	J	6 22 51.147	-.275	+24 22 11.22	-1.54	1.769780
66 12 01.28	9460.78445	T	6 20 04.724	-.338	+24 39 59.27	-1.60	1.741911
66 12 05.27	9464.77134	G	6 16 54.686	-.364	+24 58 03.57	-1.43	1.718004
66 12 28.19	9487.69271	J	5 54 03.216	-.393	+26 35 45.68	-2.13	1.666627
67 01 07.15	9497.65854	G	5 44 08.764	-.360	+27 09 23.55	-1.84	1.691561
67 01 12.14	9502.64188	R	5 39 47.686	-.359	+27 23 40.58	-2.31	1.714210
67 01 13.13	9503.63859	K	5 38 59.450	-.335	+27 26 20.95	-1.99	1.719506
67 01 17.12	9507.62561	K	5 36 01.369	-.345	+27 36 26.19	-2.06	1.743118
67 01 19.11	9509.61923	D	5 34 41.919	-.381	+27 41		1.756318
67 01 20.11	9510.61607	R	5 34 04.803	-.340	+27 43 26.00	-1.88	1.763249
67 01 21.11	9511.61293	G	5 33 29.380	-.344	+27 45 39.79	-2.04	1.770397
67 01 23.10	9513.60672	K	5 32 23.889	-.307	+27 49 59.66	-1.87	1.785321
67 01 24.10	9514.60364	R	5 31 53.818	-.333	+27 52 05.70	-1.78	1.793087
67 01 26.09	9516.59755	K	5 30 59.213	-.338	+27 56 10.23	-1.83	1.809207
67 01 27.09	9517.59454	Y	5 30 34.726	-.309	+27 58 09.09	-1.89	1.817551

CERES

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	243		h m s	s		° ' "	"		
67 01 30.08	9520.58563	Y	5 29	32.433	-.310	+28 03	52.86	-2.03	1.843670
67 01 31.08	9521.58270	S	5 29	15.481	-.295	+28 05	43.31	-2.20	1.852724
67 02 04.07	9525.57122	S	5 28	26.828	-.315	+28 12	49.51	-1.77	1.890569
67 02 09.05	9530.55736	D	5 28	09.541	-.294	+28 21	09.38	-2.21	1.941204
67 02 12.04	9533.54932	J	5 28	22.231	-.287	+28 25	56.36	-1.58	1.973139
67 02 13.04	9534.54668	Z	5 28	30.275	-.262	+28 27	29.47	-1.88	1.984016
67 02 14.04	9535.54407	K	5 28	40.192	-.245	+28 29	01.80	-1.96	1.995001
67 02 15.04	9536.54147	C	5 28	51.961	-.256	+28 30	33.55	-1.73	2.006088
67 02 20.02	9541.52881	C	5 30	18.312	-.246	+28 37	57.81	-1.80	2.062931
67 02 22.02	9543.52390	Z	5 31	05.316	-.258	+28 40	49.94	-1.50	2.086246
67 02 24.01	9545.51906	C	5 31	59.195	-.252	+28 43	38.34	-1.45	2.109845
67 02 26.01	9547.51430	Y	5 32	59.752	-.266	+28 46	22.81	-1.65	2.133702
67 02 27.01	9548.51194	K	5 33	32.537	-.225	+28 47	43.39	-2.08	2.145719
67 03 02.00	9551.50500	K	5 35	20.379	-.253	+28 51	40.17	-1.82	2.182090
67 03 04.00	9553.50046	J	5 36	40.129	-.270	+28 54	12.72	-1.81	2.206574
67 03 07.99	9557.49159	D	5 39	37.829	-.242	+28 59	04.93	-1.08	2.255993
67 03 08.98	9558.48941	S	5 40	25.921	-.241	+29 00	14.59	-1.28	2.268424
67 03 09.98	9559.48725	K	5 41	15.459	-.210	+29 01	22.50	-1.74	2.280879

PALLAS

66 08 17.37	9354.87272	H	1 29	37.595	-.136	- 0 46	50.55	+0.04	2.254472
66 08 18.37	9355.87010	D	1 29	46.747	-.129	- 0 57	58.82	-0.20	2.241061
66 08 26.34	9363.84857	T	1 30	14.121	-.129	- 2 35	05.32	-0.78	2.139719
66 08 27.34	9364.84581	D	1 30	11.687	-.162	- 2 48	11.90	-0.50	2.127859
66 08 29.34	9366.84025	T	1 30	02.939	-.156	- 3 15	02.97	-0.41	2.104726
66 09 03.32	9371.82608	T	1 29	17.866	-.160	- 4 25			2.050507
66 09 10.30	9378.80560	T	1 27	19.170	-.174	- 6 11	56.77	-0.56	1.984109
66 09 11.30	9379.80261	G	1 26	57.009	-.164	- 6 27	42.67	+0.75	1.975603
66 09 18.28	9386.78131	Z	1 23	47.065	-.155	- 8 21	18.68	-0.45	1.923492
66 09 30.24	9398.74339	D	1 16	20.371	-.227	-11 40	36.43	-0.73	1.866502
66 10 03.23	9401.73370	T	1 14	10.526	-.198	-12 29	27.31	-0.19	1.858904
66 10 04.23	9402.73045	Z	1 13	26.085	-.181	-12 45	31.81	-0.27	1.856969
66 10 06.22	9404.72395	D	1 11	55.687	-.198	-13 17	16.99	-0.03	1.853998
66 10 07.22	9405.72069	K	1 11	09.892	-.160	-13 32	56.49	+0.06	1.852961
66 10 08.21	9406.71742	Z	1 10	23.699	-.179	-13 48	27.28	-0.67	1.852221
66 10 17.18	9415.68797	T	1 03	21.179	-.193	-15 58	53.99	+0.45	1.858777
66 10 21.17	9419.67492	D	1 00	16.536	-.239	-16 50	29.22	+0.10	1.869045
66 10 22.17	9420.67167	Z	0 59	31.429	-.173	-17 02	40.32	+0.17	1.872281
66 10 27.15	9425.65551	R	0 55	53.953	-.212	-17 59	05.78	+0.57	1.892274
66 10 28.15	9426.65230	G	0 55	12.499	-.219	-18 09	27.49	+0.21	1.897006
66 10 29.14	9427.64910	Y	0 54	31.871	-.188	-18 19	29.76	+0.10	1.901972
66 10 30.14	9428.64591	J	0 53	52.041	-.181	-18 29	12.88	-0.05	1.907168
66 10 31.14	9429.64273	C	0 53	13.101	-.168	-18 38	36.21	+0.21	1.912589
66 11 04.13	9433.63012	J	0 50	46.881	-.165	-19 12			1.936436
66 11 22.07	9451.57614	D	0 43	48.512	-.162	-20 43	46.97	+0.46	2.079245
66 11 23.07	9452.57330	K	0 43	38.529	-.114	-20 45	57.26	+0.35	2.088502
66 11 24.07	9453.57047	R	0 43	29.932	-.152	-20 47	51.06	+0.23	2.097865
66 11 27.06	9456.56208	Z	0 43	13.071	-.195	-20 51	54.78	+0.23	2.126534
66 12 01.05	9460.55114	D	0 43	11.366	-.181	-20 53	43.34	+0.06	2.165952
66 12 04.04	9463.54311	J	0 43	25.561	-.136	-20 52	30.89	+0.88	2.196262
66 12 10.02	9469.52751	J	0 44	33.026	-.163	-20 44	04.03	+1.30	2.258331
66 12 26.98	9486.48641	K	0 52	14.140	-.162	-19 43	32.56	+0.13	2.438018
66 12 30.97	9490.47735	R	0 54	55.666	-.125	-19 22	58.25	+0.30	2.479845

JUNO

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	243		h m s	s		° ' "	"	
66 11 22.40	9451.90642	S	8 40 42.643	-.056	+ 2 08	01.13	-0.27	1.613256
66 11 23.40	9452.90410	T	8 41 18.181	-.030	+ 2 01	58.44	-0.78	1.604658
66 12 15.34	9474.84778	T	8 46 43.193	-.093	+ 0 30	57.16	+0.10	1.433276
66 12 17.34	9476.84214	T	8 46 27.455	-.109	+ 0 27	38.51	-0.99	1.420095
66 12 19.33	9478.83641	K	8 46 04.268	-.048	+ 0 25	21.75	-0.23	1.407455
67 01 06.28	9496.78126	D	8 37 24.470	-.097	+ 0 53	38.05	-0.01	1.323384
67 01 12.26	9502.76171	D	8 32 49.675	-.112	+ 1 23	27.66	-0.19	1.309803
67 01 20.23	9510.73514	K	8 26 00.087	-.105	+ 2 18	00.79	+0.01	1.305152
67 01 23.22	9513.72511	Y	8 23 21.084	-.114	+ 2 42	15.62	+0.08	1.307589
67 01 24.22	9514.72177	T	8 22 28.116	-.079	+ 2 50	44.54	+0.14	1.308920
67 01 29.20	9519.70509	J	8 18 06.351	-.137	+ 3 35	44.13	-0.08	1.319488
67 01 30.20	9520.70177	Y	8 17 15.222	-.106	+ 3 45	11.58	+0.08	1.322388
67 01 31.19	9521.69846	S	8 16 24.640	-.107	+ 3 54	46.61	+0.01	1.325551
67 02 12.15	9533.65949	J	8 07 27.656	-.111	+ 5 56	25.03	-0.44	1.383771
67 02 13.15	9534.65634	Z	8 06 50.676	-.087	+ 6 06	49.23	+0.14	1.390268
67 02 14.15	9535.65320	K	8 06 15.128	-.094	+ 6 17	13.03	+0.69	1.397007
67 02 20.13	9541.63473	C	8 03 14.249	-.119	+ 7 18	56.54	0.00	1.442363
67 02 27.11	9548.61405	K	8 00 59.029	-.060	+ 8 28	08.43	-0.52	1.505209
67 03 01.10	9550.60833	S	8 00 36.005	-.033	+ 8 47	05.22	-0.35	1.524975
67 03 08.08	9557.58892	D	8 00 10.856	-.037	+ 9 49	45.22	-0.15	1.599925
67 03 09.08	9558.58623	S	8 00 14.236	-.100	+ 9 58	12.28	+0.30	1.611317
67 03 11.08	9560.58091	G	8 00 26.348	-.098	+10 14	40.31	+0.08	1.634577
67 03 12.07	9561.57828	J	8 00 35.010	-.080	+10 22	41.07	-0.60	1.646436
67 03 27.04	9576.54108	J	8 06 00.681	-.061	+12 04	58.11	+0.02	1.839928
67 03 30.03	9579.53411	S	8 07 46.173	-.089	+12 21	14.72	+0.17	1.881529
67 03 31.03	9580.53182	J	8 08 24.118	-.031	+12 26	21.21	-0.23	1.895572

VESTA

67 01 20.50	9511.00296	K	14 52 43.448	+ .135	- 9 08	44.29	-1.50	2.249438
67 01 23.49	9513.99794	Y	14 57 18.275	+ .103	- 9 22	45.17	-1.49	2.211854
67 01 24.49	9514.99625	T	14 58 48.822	+ .119	- 9 27	12.65	-1.16	2.199291
67 01 26.49	9516.99286	R	15 01 48.162	+ .123	- 9 35	49.30	-0.92	2.174119
67 01 29.48	9519.98772	D	15 06 12.640	+ .116	- 9 47	57.17	-0.73	2.136262
67 02 01.48	9522.98252	G	15 10 31.313	+ .113	- 9 59	07.45	-0.58	2.098313
67 02 05.47	9526.97546	Z	15 16 06.413	+ .128	-10 12	30.87	-0.81	2.047630
67 02 13.46	9534.96091	G	15 26 38.031	+ .126	-10 34	02.87	-0.95	1.946390
67 02 14.45	9535.95904	D	15 27 52.999	+ .142	-10 36	14.94	-1.00	1.933785
67 02 22.44	9543.94371	S	15 37 16.895	+ .126	-10 49	59.37	-1.35	1.833727
67 02 27.43	9548.93372	G	15 42 33.943	+ .123	-10 55	09.35	-1.20	1.772171
67 03 01.42	9550.92962	C	15 44 32.397	+ .148	-10 56	29.46	-0.68	1.747818
67 03 08.41	9557.91482	J	15 50 45.356	+ .156	-10 58	01.50	-1.34	1.664103
67 03 10.41	9559.91044	Z	15 52 19.130	+ .148	-10 57	33.52	-0.24	1.640702
67 03 18.39	9567.89220	G	15 57 31.959	+ .174	-10 52	06.64	-1.20	1.550017
67 03 19.38	9568.88984	Y	15 58 03.672	+ .149	-10 51	02.19	-0.81	1.539057
67 03 25.37	9574.87523	C	16 00 37.520	+ .144	-10 43	00.70	-0.81	1.475328
67 03 27.37	9576.87020	G	16 01 14.407	+ .131	-10 39	46.13	-1.23	1.454923
67 03 30.36	9579.86248	K	16 01 55.765	+ .157	-10 34	23.81	-0.91	1.425175
67 03 31.35	9580.85987	G	16 02 05.727	+ .154	-10 32	29.56	-1.30	1.415501
67 04 04.34	9584.84918	J	16 02 26.026	+ .131	-10 24	17.84	-1.18	1.378102
67 04 12.32	9592.82670	G	16 01 31.009	+ .172	-10 05	50.43	-1.21	1.310285
67 04 23.29	9603.79345	J	15 56 51.886	+ .150	- 9 38			1.235041
67 04 29.27	9609.77428	G	15 52 50.280	+ .165	- 9 24	53.06	-1.51	1.204070
67 05 04.25	9614.75784	S	15 48 48.789	+ .168	- 9 14	34.30	-1.42	1.184243

VESTA

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	243		h m s	s					
67 05 09.24	9619.74107	T S	15 44	18.934	+.185	- 9 06	02.01	-1.49	1.170181
67 05 12.23	9622.73090	T S	15 41	27.378	+.193	- 9 01	59.97	-0.69	1.164601
67 05 13.22	9623.72749	G S	15 40	29.088	+.182	- 9 00	53.16	-1.65	1.163224
67 05 17.21	9627.71384	J S	15 36	32.777	+.194	- 8 57	31.27	-0.88	1.160136
67 05 19.20	9629.70701	S S	15 34	33.925	+.166	- 8 56	35.93	-1.27	1.160041
67 05 24.18	9634.68997	J S	15 29	40.429	+.158	- 8 56	38.34	-1.50	1.163977
67 05 25.18	9635.68658	S S	15 28	43.032	+.192	- 8 57	04.51	-1.82	1.165471
67 05 26.18	9636.68319	J S	15 27	46.213	+.212	- 8 57	38.62	-1.41	1.167198
67 05 27.17	9637.67981	D S	15 26	49.982	+.142	- 8 58	21.71	-1.13	1.169155
67 05 29.17	9639.67308	Y S	15 25	00.017	+.186	- 9 00	15.78	-1.69	1.173760
67 06 03.15	9644.65645	J S	15 20	41.849	+.155	- 9 07	39.17	-1.41	1.189209
67 06 04.15	9645.65316	S S	15 19	53.712	+.192	- 9 09	35.94	-1.61	1.192957
67 06 05.14	9646.64989	G S	15 19	06.839	+.193	- 9 11	42.46	-2.12	1.196919
67 06 06.14	9647.64664	D S	15 18	21.341	+.210	- 9 13	57.53	-1.81	1.201092
67 06 07.14	9648.64340	S S	15 17	37.219	+.183	- 9 16	21.94	-1.45	1.205473
67 06 08.14	9649.64018	G S	15 16	54.608	+.190	- 9 18	56.43	-1.89	1.210059
67 06 10.13	9651.63378	G S	15 15	33.953	+.155	- 9 24	33.16	-2.12	1.219836
67 06 11.13	9652.63062	J S	15 14	56.054	+.169	- 9 27	35.27	-2.08	1.225019
67 06 17.11	9658.61202	C S	15 11	44.469	+.150	- 9 48	57.45	-0.90	1.260020
67 06 21.10	9662.60004	R S	15 10	12.898	+.172	-10 06	05.69	-1.21	1.286799
67 07 01.07	9672.57161	Y S	15 08	35.474	+.157	-10 57	52.52	-1.82	1.364238

MOON

Lun.	Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)
		243			h m s	s			° ' "	"	
537	66 05 29.03	9274.53348	R	1	12 04	23.128	1.349	N	+ 4 17	31.38	-10.27
	66 06 01.13	9277.63483	K	1	14 42	33.507	1.359	N	-14 33	48.84	-7.92
	66 06 03.20	9279.70792	R	1	16 35	59.513	1.519	S	-23 27	37.13	-6.00
	66 06 05.28	9281.78493	I	2	18 35	04.310	1.510	S	-26 45	32.74	-2.12
	66 06 06.32	9282.82260	Z	2	19 33	24.682	1.435	N	-26 05	45.71	+2.46
538	66 06 28.04	9304.54865	R	1	14 24	34.151	1.329	N	-12 46	23.42	-9.09
	66 06 30.11	9306.61924	R	1	16 14	23.481	1.473	N	-22 13	32.53	-4.09
	66 07 01.15	9307.65667	H	1	17 12	22.661	1.463		-25 08		
	66 07 03.23	9309.73277	D	2	19 10	08.629	1.532	S	-26 29	23.48	-0.18
	66 07 04.26	9310.76935	T	2	20 06	54.810	1.395	S	-24 57	29.74	+2.32
539	66 08 01.21	9338.71695	Z	1	20 41	38.675	1.351		-23 16		
	66 08 02.24	9339.74989	W	2	21 33	08.314	1.218		-19 48		
	66 08 04.31	9341.80984	H	2	23 07	35.483	1.096		-10 38		
540	66 08 23.98	9361.48394	L	1	16 35	51.798	1.526		-23 51		
	66 08 25.02	9362.52145	K	1	17 33	58.358	1.514		-26 09		
	66 08 26.05	9363.55909	G	1	18 32	15.845	1.442	S	-26 56	50.05	-1.60
	66 08 27.09	9364.59598	H	1	19 29	28.729	1.379	S	-26 16	03.70	+1.30
	66 08 28.13	9365.63134	R	1	20 24	28.806	1.297	S	-24 14	35.51	+3.71
	66 08 29.16	9366.66471	T	1	21 16	36.342	1.213	S	-21 04	39.83	+5.43
	66 08 30.19	9367.69603	H	1	22 05	46.018	1.201	S	-17 00	25.06	+7.27
	66 09 01.25	9369.75376	Z	2	23 37	00.714	1.040		- 7 04		
	66 09 02.28	9370.78124	H	2	0 20	38.050	1.063	N	- 1 36	56.32	+7.22
	66 09 03.30	9371.80865	T	2	1 04	09.258	1.072		+ 3 54		
541	66 09 23.00	9391.50970	R	1	19 11	20.172	1.243	S	-26 50	45.92	-0.81
	66 09 24.04	9392.54579	D	1	20 07	23.261	1.202	S	-25 11	47.75	+2.31
	66 09 30.22	9398.72511	D	2	0 49	58.382	1.187	S	+ 2 11	47.81	+7.67
	66 10 03.31	9401.81270	T	2	3 08	16.366	1.277	N	+17 54	16.18	+6.23
	66 10 04.34	9402.84578	Z	2	3 59	59.043	1.199	N	+22 02	08.85	+5.23
	66 10 07.46	9405.96002	K	2	6 56	46.544	1.555		+27 09		
542	66 10 21.99	9420.49339	Z	1	20 42	07.039	1.308		-23 36		
	66 10 23.02	9421.52621	C	1	21 33	27.307	1.187		-20 03		
	66 10 24.05	9422.55681	Z	1	22 21	35.014	1.135		-15 41		
	66 10 27.14	9425.64094	R	1	0 34	53.375	1.043	S	+ 0 13	20.39	+8.53
	66 10 28.16	9426.66867	G	1	1 18	52.329	1.111	S	+ 5 50	54.54	+7.54
	66 10 29.19	9427.69740	T	1	2 04	18.136	1.126	S	+11 19	28.55	+7.67
	66 10 30.22	9428.72781	D	2	2 52	08.872	1.172	N	+16 25	25.74	+6.63
	66 10 31.26	9429.76046	T	2	3 43	14.052	1.267	N	+20 52	48.60	+5.58
	66 11 01.29	9430.79569	G	2	4 38	02.834	1.347		+24 23		
543	66 11 18.93	9448.43846	G	1	21 13	12.345	1.327	S	-21 37	14.03	+3.39
	66 11 19.97	9449.47031	C	1	22 03	07.410	1.158	S	-17 29	21.98	+6.99
	66 11 20.99	9450.49997	Z	1	22 49	54.080	1.102	S	-12 42	06.04	+5.19
	66 11 22.02	9451.52814	D	1	23 34	31.376	1.070	S	- 7 27	51.80	+8.39
	66 11 23.05	9452.55558	K	1	0 18	04.473	1.072	S	- 1 57	18.67	+7.47
	66 11 24.08	9453.58304	R	1	1 01	40.173	1.132	S	+ 3 39	56.17	+7.91
	66 11 25.11	9454.61130	C	1	1 46	25.315	1.138	S	+ 9 13	31.78	+8.07
	66 11 27.17	9456.67319	Z	1	3 23	40.293	1.242	S	+19 17	39.19	+5.66
544	66 12 18.94	9478.44159	G	1	23 15	59.672	1.123	S	- 9 33	39.30	+9.16
	66 12 19.96	9479.46927	D	1	23 59	54.066	1.005	S	- 4 08	20.82	+9.76
	66 12 22.02	9481.52415	Z	1	1 27	01.657	1.133	S	+ 6 59	15.68	+8.69
	66 12 23.05	9482.55299	K	1	2 12	37.430	1.139	S	+12 22	05.33	+7.52
	66 12 27.19	9486.69374	K	1	5 51	37.668	1.553	N	+26 55	10.13	+0.72
	66 12 28.23	9487.73525	Z	2	6 55	30.571	1.598	N	+27 08	55.75	-1.96
	67 01 02.42	9492.92643	D	2	11 51	16.607	1.356	S	+ 5 06	45.55	-8.74

14 SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS

MOON

Lun.	Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)
		243			h m s	s			° ' "	"	
545	67 01 17.93	9508.43732	C	1	1 08	06.043	1.077		+ 4 53		
	67 01 18.96	9509.46524	D	1	1 52	21.760	1.041		+10 18		
	67 01 19.99	9510.49469	R	1	2 38	50.040	1.173	S	+15 24	47.00	+6.33
	67 01 21.02	9511.52646	G	1	3 28	39.434	1.252	S	+19 58	53.61	+5.84
	67 01 23.09	9513.59915	K	1	5 21	30.149	1.515		+26 17		
	67 01 24.14	9514.63988	R	1	6 24	15.194	1.631	N	+27 19	41.67	-0.18
	67 01 26.22	9516.72424	R	2	8 33	56.756	1.561	N	+23 52	14.81	-5.48
	67 01 27.26	9517.76474	Z	2	9 36	22.325	1.443		+19 30		
	67 01 31.40	9521.90786	K	2	13 18	48.074	1.366	S	- 6 22	16.28	-9.94
	67 02 01.44	9522.94224	G	2	14 12	23.391	1.491	S	-12 43	51.74	-9.65
546	67 02 16.93	9538.43781	R		3 07			S	+18 25	40.99	+5.76
	67 02 20.04	9541.54470	C	1	5 53	16.373	1.461		+27 15		
	67 02 22.12	9543.62736	Z	1	8 00	30.632	1.578	N	+25 35	50.50	-3.20
	67 02 24.20	9545.70847	C	1	10 05	31.060	1.410	N	+16 51	22.42	-9.00
	67 02 25.24	9546.74640	T	2	11 04	13.216	1.374	N	+10 30	36.67	-10.68
	67 02 26.28	9547.78278	Z	2	12 00	42.273	1.428	S	+ 3 29	04.01	-10.83
	67 02 27.31	9548.81834	G	2	12 55	59.180	1.491	S	- 3 42	25.19	-11.20
	67 03 01.39	9550.89018	C	2	14 47	36.799	1.478	S	-16 42	01.09	-9.86
	67 03 03.46	9552.96649	Z	2	16 45	41.346	1.681	S	-25 16	23.69	-6.23
547	67 03 18.95	9568.45375	C	1	5 28	23.979	1.454		+26 56		
	67 03 19.99	9569.49256	Z	1	6 28	22.728	1.506	N	+27 43	48.42	-0.24
	67 03 25.18	9574.68800	R	1	11 30	17.521	1.441	N	+ 7 21	07.05	-12.06
	67 03 27.26	9576.76054	G	2	13 22	55.504	1.468	S	- 7 14	30.67	-10.67
	67 03 30.37	9579.87597	K	2	16 21	25.307	1.571	S	-24 12	34.61	-5.92
	67 03 31.41	9580.91679	G	2	17 24	18.420	1.664		-26 53		
	67 04 01.45	9581.95745	C	2	18 26	57.734	1.606		-27 47		
548	67 04 21.09	9601.59462	Z	1	11 01	54.019	1.443		+10 52		
	67 04 23.16	9603.66576	R	1	12 52	31.017	1.411		- 3 19		
	67 04 24.20	9604.70227	K	1	13 49	10.071	1.454		-10 28		
	67 04 28.36	9608.86480	T	2	17 59	38.328	1.711		-27 40		
	67 04 29.40	9609.90624	G	2	19 03	24.327	1.622		-27 33		
549	67 05 19.04	9629.54028	D	1	11 33	50.334	1.334	N	+ 6 55	24.81	-10.76
	67 05 24.22	9634.72548	C	2	16 20	58.525	1.720	S	-24 12	48.40	-5.12
	67 05 26.31	9636.81139	G	2	18 32	53.957	1.720	S	-27 47	35.05	+0.61
	67 05 27.35	9637.85279	D	2	19 36	37.900	1.618	N	-26 42	03.90	+2.12
550	67 06 17.02	9658.52121	C	1	13 00	38.342	1.340	N	- 4 32	58.86	-11.32
	67 06 21.17	9662.67274	R	1	16 55	12.911	1.677	S	-25 54	01.74	-5.05
	67 06 27.40	9668.90050	T	2	22 47	43.545	1.181	N	-12 14	27.63	+7.25